At page 84, line 35, after the sequence ending "AIHD" but before the semicolon, please add --(SEQ ID NO:25)--.

At page 89, line 19 please delete "ino-exchnage" and insert --ion-exchange--.

At page 89, line 26, please delete "eulates" and insert --eluates--.

At page 94, line 3, after "PPPSS-trunc", please insert --PPPSS corresponds to amino acids 211 to 215 of SEQ ID NO:2--.

At page 111, line 3, please replace "AMINO ACIDS" within the primer sequence with --AA--.

At page 111, line 4, before "(sense)", please insert --SEQ ID NO:13--.

At page 111, line 4, before "antisense", please insert --SEQ ID NO:14--.

At page 112, line 25, please delete "1306-1327" and insert --599-621--.

At page 112, line 26, after "MEKK4 sequence" but before the closed parenthesis, please insert – set forth as SEQ ID NO:12)--.

A2

Please replace pages 124-185 of the specification with substitute pages 124-177 filed herewith. Please renumber the pages containing the claims and abstract accordingly.

In The Claims:

Please cancel claims 1-39.

Please amend claim 40 as follows:

A3

40. (Amended) A method for modulating one or more of growth, differentiation, or survival of a mammalian cell [said cell possessing or engineered to posses MEKK substrates], comprising treating the cell with an effective amount of an agent which activates or inactivates MEKK polypeptide thereby altering, relative to the cell in the absence of the agent, at least one of (i) rate of growth, (ii) differentiation, or (iii) survival of the cell.

Please add new claims 41-64, as follows:

A4

41. A method for regulating homeostasis of a cell comprising contacting the cell with a compound that regulates the activity of an MEKK protein in said cell such that homeostasis of the cell is regulated.

42. The method of claim 41, wherein said method comprises contacting said cell with a compound that inhibits the ability of a regulatory domain of said MEKK protein to regulate the activity of a kinase domain of said MEKK protein.

43. The method of claim 41, wherein said method comprises contacting said cell with a peptide that binds to the regulatory domain of said MEKK protein, wherein said peptide inhibits the ability of said regulatory domain to regulate the activity of a kinase domain.

44. The method of claim 41, wherein said method comprises contacting said cell with a peptide that binds to the kinase catalytic domain of said MEKK protein, wherein said peptide inhibits the ability of said MEKK protein to be phosphorylated or to phosphorylate a substrate.

45. The method of claim 41, wherein said cell is selected from the group consisting of a T cell, a B cell, a neutrophil, a macrophage, a basophil, a neuronal cell, an epidermal cell, a mast cell, a dendritic cell, a pluripotent stem cell and a fibroblast.

46. The method of claim 41, wherein said cell is a cell involved in a disease, said disease being selected from the group consisting of cancer, autoimmune diseases, allergic responses, graft-host rejection, inflammatory responses and neurological disorders.

47. The method of claim 41, wherein said method comprises transforming or transfecting said cell with a nucleic acid molecule encoding an MEKK protein.

48. The method of claim 47, wherein said nucleic acid molecule encodes an MEKK protein that lacks a regulatory domain.

49. The method of claim 47, wherein said nucleic acid molecule encodes an MEKK protein comprising an amino acid sequence having at least 85% identity with a catalytic kinase domain of an MEKK protein selected from the group consisting of SEQ ID NO: 2, SEQ ID NO: 4, SEQ ID NO: 6, SEQ ID NO: 8, SEQ ID NO: 10, SEQ ID NO: 12 and SEQ ID NO:14.

A4 CONT.

50. The method of claim 48, wherein said nucleic acid molecule encodes an MEKK protein comprising an amino acid sequence having at least 85% identity with a regulatory domain of an MEKK protein selected from the group consisting of SEQ ID NO: 2, SEQ ID NO: 4, SEQ ID NO: 6, SEQ ID NO: 8, SEQ ID NO: 10, SEQ ID NO: 12 and SEQ ID NO:14.

51. The method of claim 47, wherein said nucleic acid molecule is capable of hybridizing under stringent conditions with a nucleic acid molecule selected from the group consisting of SEQ ID NO: 1, SEQ ID NO: 3, SEQ ID NO: 5, SEQ ID NO: 7, SEQ ID NO: 9, SEQ ID NO: 11 and SEQ ID NO:13.

52. The method of claim 51, wherein said nucleic acid molecule encodes an MEKK protein selected from the group consisting of SEQ ID NO: 2, SEQ ID NO: 4, SEQ ID NO: 6, SEQ ID NO: 8, SEQ ID NO: 10, SEQ ID NO: 12 and SEQ ID NO:14.

53. A method for regulating apoptosis of a cell comprising contacting the cell with an agent that directly regulates the activity of an MEKK protein in said cell such that apoptosis of the cell is regulated.

54. The method of claim 53, wherein said method comprises contacting said cell with a compound that inhibits the ability of a regulatory domain of said MEKK protein to regulate the activity of a kinase domain of said MEKK protein.

55. The method of claim 53, wherein said method comprises contacting said cell with a peptide that binds to the regulatory domain of said MEKK protein, wherein said peptide inhibits the ability of said regulatory domain to regulate the activity of a kinase domain of said MEKK protein.

56. The method of claim 53, wherein said method comprises contacting said cell with a peptide that binds to the kinase catalytic domain of said MEKK protein, wherein said peptide inhibits the ability of said MEKK protein to be phosphorylated or to phosphorylate a substrate.

57. The method of claim 53, wherein said cell is selected from the group consisting of a T cell, a B cell, a neutrophil, a macrophage, a basophil, a neuronal cell, an epidermal cell, a mast cell, a dendritic cell, a pluripotent stem cell and a fibroblast.

A4 CONT.

58. The method of claim 53, wherein said cell comprises a cell involved in a disease, said disease being selected from the group consisting of cancer, autoimmune diseases, allergic responses, graft-host rejection, inflammatory responses and neurological disorders.

59. The method of claim 53, wherein said method comprises transforming or transfecting said cell with a nucleic acid molecule encoding an MEKK protein.

60. The method of claim 59, wherein said nucleic acid molecule encodes an MEKK protein having kinase activity that is not regulated.

61. The method of claim 59, wherein said nucleic acid molecule encodes an MEKK protein comprising an amino acid sequence having at least 85% identity with a catalytic kinase domain of an MEKK protein selected from the group consisting of SEQ ID NO: 2, SEQ ID NO: 4, SEQ ID NO: 6, SEQ ID NO: 8, SEQ ID NO: 10, SEQ ID NO: 12 and SEQ ID NO:14.

62. The method of claim 59, wherein said nucleic acid molecule encodes an MEKK protein comprising an amino acid sequence having at least 85% identity with a regulatory domain of an MEKK protein selected from the group consisting of SEQ ID NO: 2, SEQ ID NO: 4, SEQ ID NO: 6, SEQ ID NO: 8, SEQ ID NO: 10, SEQ ID NO: 12 and SEQ ID NO:14.

63. The method of claim 59, wherein said nucleic acid molecule is capable of hybridizing under stringent conditions with a nucleic acid molecule selected from the